JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

Thursday, May 19, 2005, 1:00 p.m.

JPL - Building 303, Room 401

AGENDA

1. **Introductory Remarks ..... D. Morris**
2. **Conflict Resolution ..... D. Morris**
3. **Action Items..... D. Morris**
4. **SPECIAL REPORTS:**
   - **Stardust Re-Entry Plans ..... R. Ryan**
5. **Resource Analysis Team ..... E. Hampton**
   - **Mid-Range Status**
   - **DSN Downtime Forecast**
   - **Special Studies**

Jet Propulsion Laboratory
California Institute of Technology

4800 Oak Grove Drive
Pasadena, CA 91109-8099

(818) 354-4321

June 9, 2005

TO: Distribution

FROM: David Morris

SUBJECT: Minutes for the Joint Users Resource Allocation Planning Committee Meeting held May 19, 2005.

NEXT JURAP MEETING:
Thursday, June 16, 2005
JPL Bldg. 303, Room 401 - 1:00 p.m.

Attendees:

Andujo, A	Hall, J.	Morris, D.	Tay, P.
Brymer, B.	Hampton, E.	Resnick, M.	Waldherr, S.
Cameron, L.	Hills, D.	Retana, J.	Young-Anderson, E.
Doody, D.	Lacey, N.	Ryan, R.	Zamora, K.
Guduru. S.	Martinez, G.	Satterlee, N.	

The Joint Users Resource Allocation Planning Committee meets monthly to review the status of Flight Projects, the requirements of other resource users, and to identify future requirements and outstanding conflicts. The last regular meeting was held on April 21, 2004 at the Jet Propulsion Laboratory.

Introductory Remarks – D. Morris

D. Morris welcomed the attendees to the JURAP meeting and announced that RAPSO Office will be dissolved effective June 1, 2005. Gene Burke will become a TMS Manager. The functions and services are still in place under the Deep Space Mission System Commitments Office (Section 911) of the Interplanetary Networks Directorate and D. Morris has been tasked with the technical cognizance of day-to-day resource allocation planning activities of the Deep Space Network.

The following items were announced:

- The RARB ULP and Major Events Input deadline is tomorrow, May 20, 2005
- A DSS-27 Downtime is under consideration to install full NSP capabilities.
- Discussions are underway regarding the closing some or all of the 26 Meter stations.

RARB Action Items – D. Morris
D. Morris reported that the status of the single Action Item from the February RARB remains unchanged.

Action Item: Pending
Externally review the new RFC requirements and implementations to understand impact to users.

SPECIAL REPORTS
Stardust Re-Entry Plans (Entry, Descent and Landing) – R. Ryan

R. Ryan stated that a series of trajectory maneuvers are required to get the spacecraft safely to the release point for the sample return capsule to reach the Earth entry target and then divert the spacecraft for flyby and safe orbit.

EDL coverage summary is as follows:

- EDL IS A SERIES OF TRAJECTORY MANEUVERS
  - STARTING IN NOVEMBER – SIX MANEUVER OPPORTUNITIES
    - CONTINUOUS, OR NEAR CONTINUOUS COVERAGE
  - NOMINAL SAFE ORBIT AND DISPOSAL BY FEBRUARY 16

- 70 METER COVERAGE FROM DECEMBER 15 TO JANUARY 10
  - LINK MARGIN, HIGH GAIN NOT EARTH POINTED

- CRITICAL PERIOD DUAL STATION COVERAGE JANUARY 13, 14, 15
  - FROM TCM 19 THROUGH RELEASE

- CRITICAL COMMAND FOR CAPSULE RELEASE ON JANUARY 15
  - DUAL STATION FULL COMPLEX OVERLAPS (4 DSS'S)

- AGREEMENT WITH NHPC ON CRITICAL SUPPORT COVERAGE

Resource Analysis Team – J. Retana
Resource Negotiations Status

The Mid-range Scheduling process has negotiated Mid-Range Schedules through Week 48 (December 12, 2005) - twenty-seven (27) weeks ahead of real-time. Currently, there are 8 weeks of conflict-free schedules. Conflict Resolution is required for the following sixteen (16) weeks: 33 through 48.

The next Resource Allocation Review Board Negotiation Process is scheduled for August to review and address contention from July, 2006 through December, 2008. The deadline for Projects/Users response for the August RARB is tomorrow, 20 May 2005

A special study entitled "STEREO Ahead & Behind Study of Increased Support for February 2006 through May 2006" was completed last month.

There were no major DSN Antenna Downtime Status/Forecast changes.

Action Item Status From 8 February 2005 RARB

(Resource Allocation Review Board)

David G. Morris

Action Item Summary

AI#	*Year*	*Month(s)*	*System*	*Responsible*	*Due Date*	*Status*
01	2006 - 08	All	RFC	B. Geldzahler	TBD	Pending

ACTION: Externally review the new RFC requirements and implementations to understand impact to users.

RESPONSE: (2/18/2005) B. Geldzahler suggested that "… this item is closed. First of all NRAO asked for too much money to go forward. Second. We don't need the Ka-band catalog. I spoke with Jim Border and Steve Lichten about this. We can use DDOR at X-band to get us close and the use Steve Synnott's optical autonomous Nav camera to do the rest. We need this anyway because ODF light travel time limitations. So the upshot is that we save money by not going forward with NRAO and the new Nav technique to be demoed on Mars '09 then takes over."

(3/7/2005) C. Jacobs reported to R. Miller that he is working with S. Lichten to clarify the justification for the need and rationale for Ka-band reference frames for VLBI, aiding in delta DOR for navigation, and blind pointing.

STARDUST Earth Return Phase

(Entry, Descent and Landing)

SPECIAL REPORT TO THE JOINT USERS

A SERIES OF TRAJECTORY MANEUVERS TO GET THE SPACECRAFT SAFELY TO THE RELEASE POINT FOR THE SAMPLE RETURN CAPSULE TO REACH THE EARTH ENTRY TARGET; THEN DIVERT THE SPACECRAFT FOR FLYBY AND SAFE ORBIT

May 19, 2005

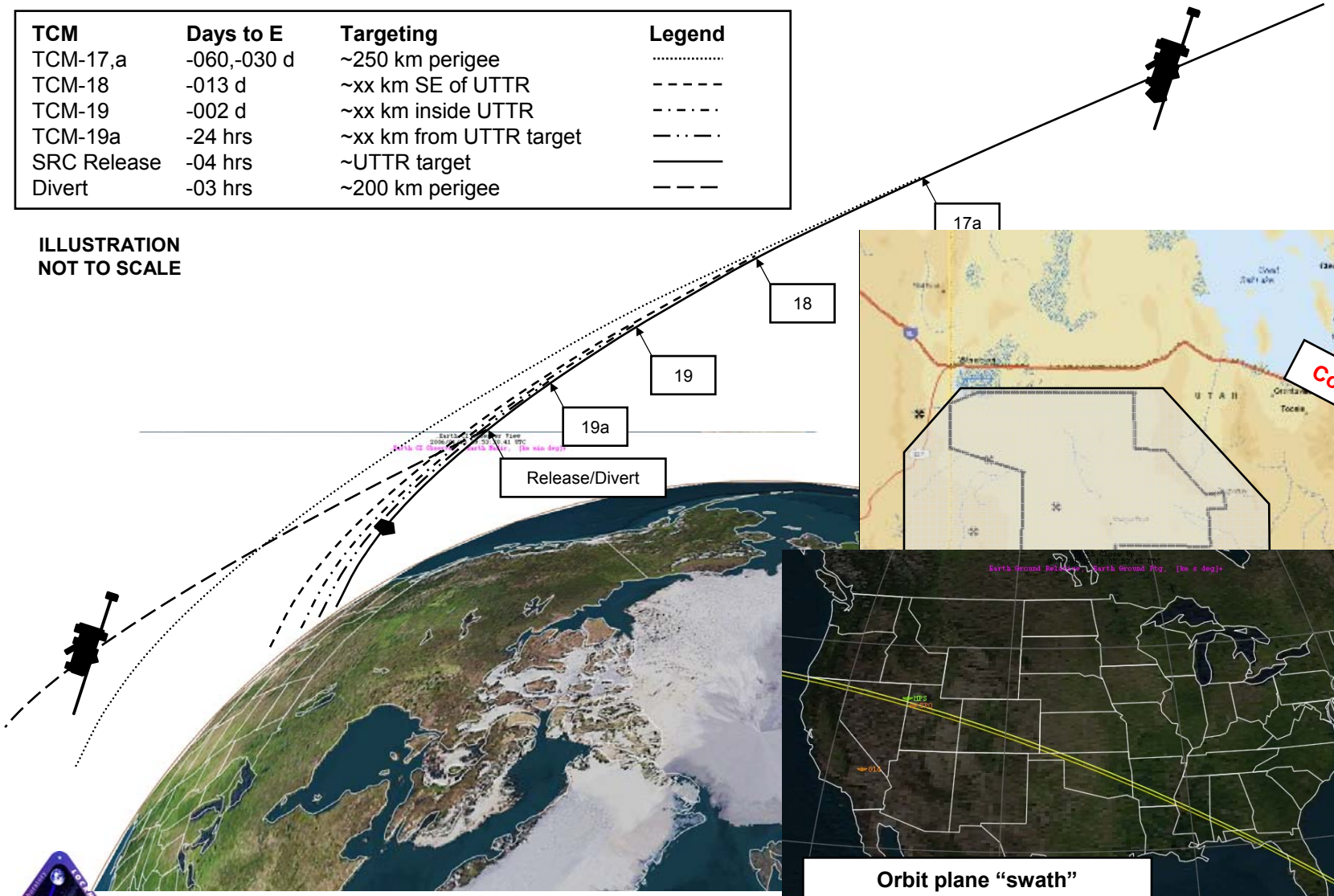
Robert Ryan

LOCKHEED MARTIN

Approach Navigation

TCM	Days to E	Targeting	Legend
TCM-17,a	-060,-030 d	~250 km perigee	·····
TCM-18	-013 d	~xx km SE of UTTR	- - - - -
TCM-19	-002 d	~xx km inside UTTR	- · - · - ·
TCM-19a	-24 hrs	~xx km from UTTR target	— · · — ·
SRC Release	-04 hrs	~UTTR target	——
Divert	-03 hrs	~200 km perigee	— — —

ILLUSTRATION NOT TO SCALE

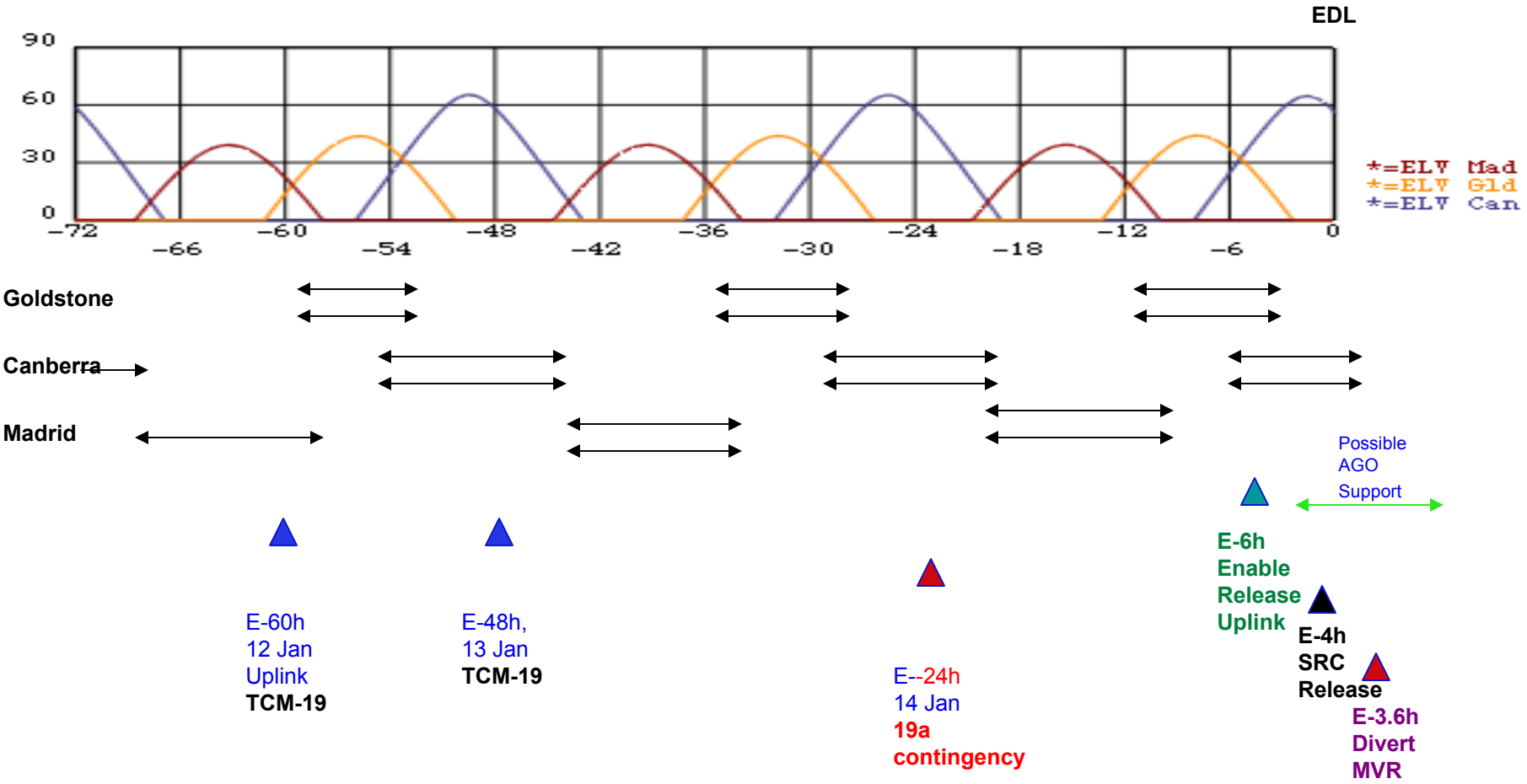


Approach DSN COVERAGE

Recent circumstances dictated revised, more cautious, requirements for Return

- The link margin because of the spacecraft entry pointing attitude will require 70 meter support starting from December 15 (DOY 357) through January 10. The spacecraft pointing attitude related to entry aim point precludes use of the High Gain antenna. A minimum of 10, to 16 hours per day is required for telemetry data. 34 meter stations can fill in as required for radio metric support for navigation.
- During the final TCM and approach dual station coverage is required
- For the Release Sequence, because of critical commanding, dual stations at dual complexes are required.
- NHPC Launch and SDU EDL has been agreed in principle.
- NHPC launch on January 11, 12 or 13 fits with SDU Entry
- If NHPC launch slips, they will not attempt a launch on January 14.
- If NHPC launches on the 15th or beyond, SDU will adjust coverage.

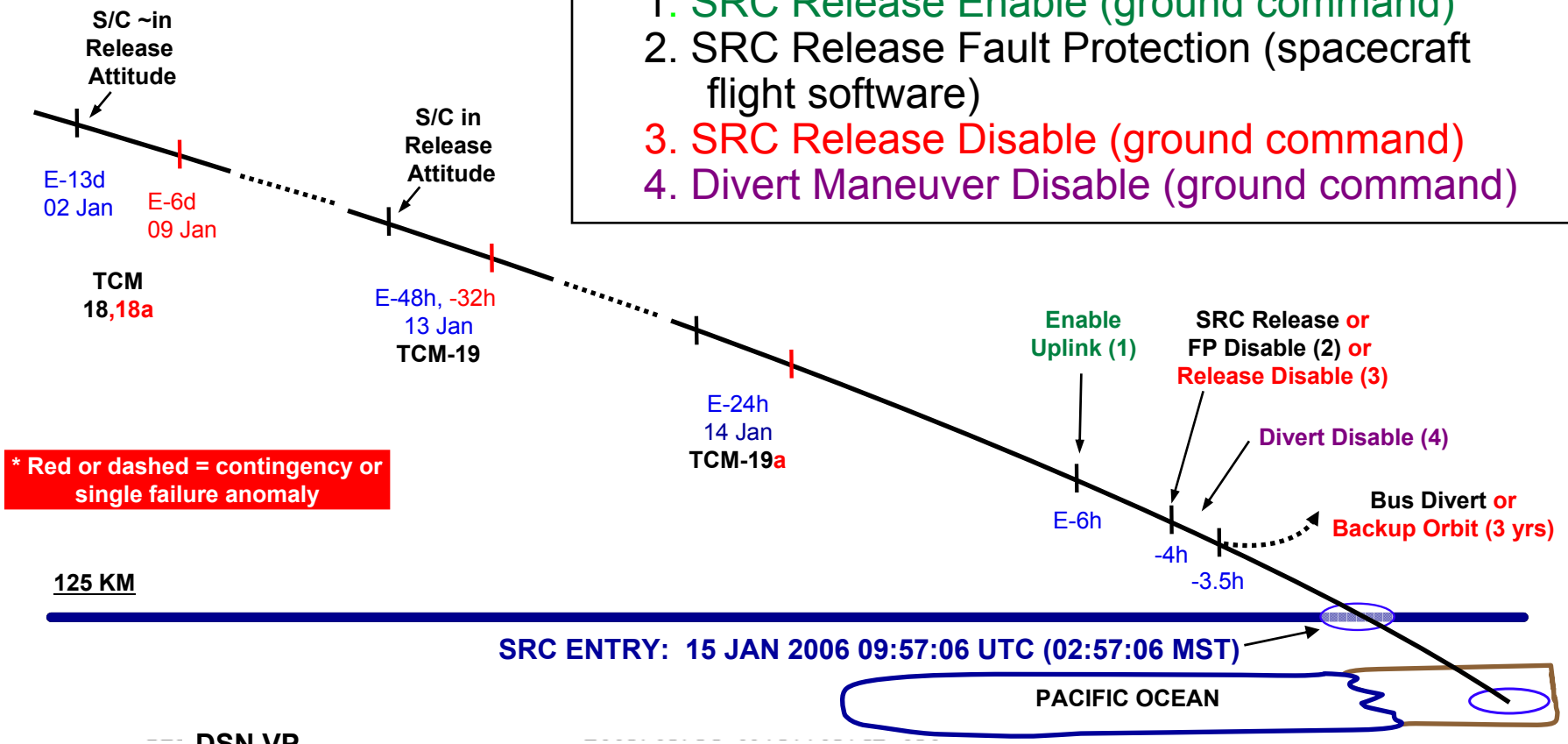
EDL TRACKING COVERAGE



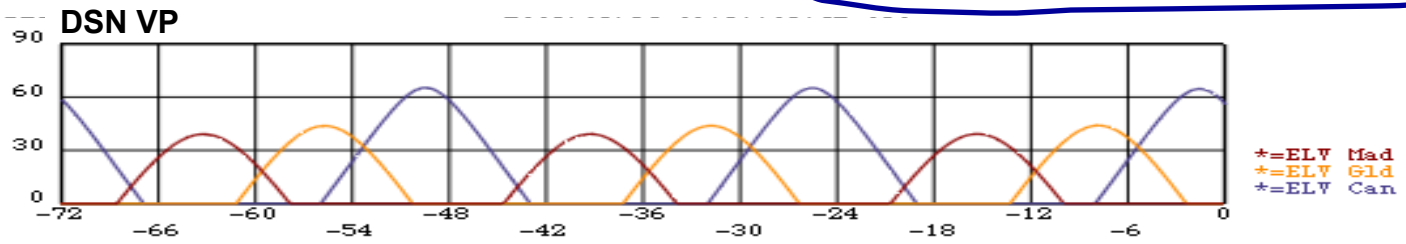
Terminal Approach

Earth Entry Decision Mechanisms:

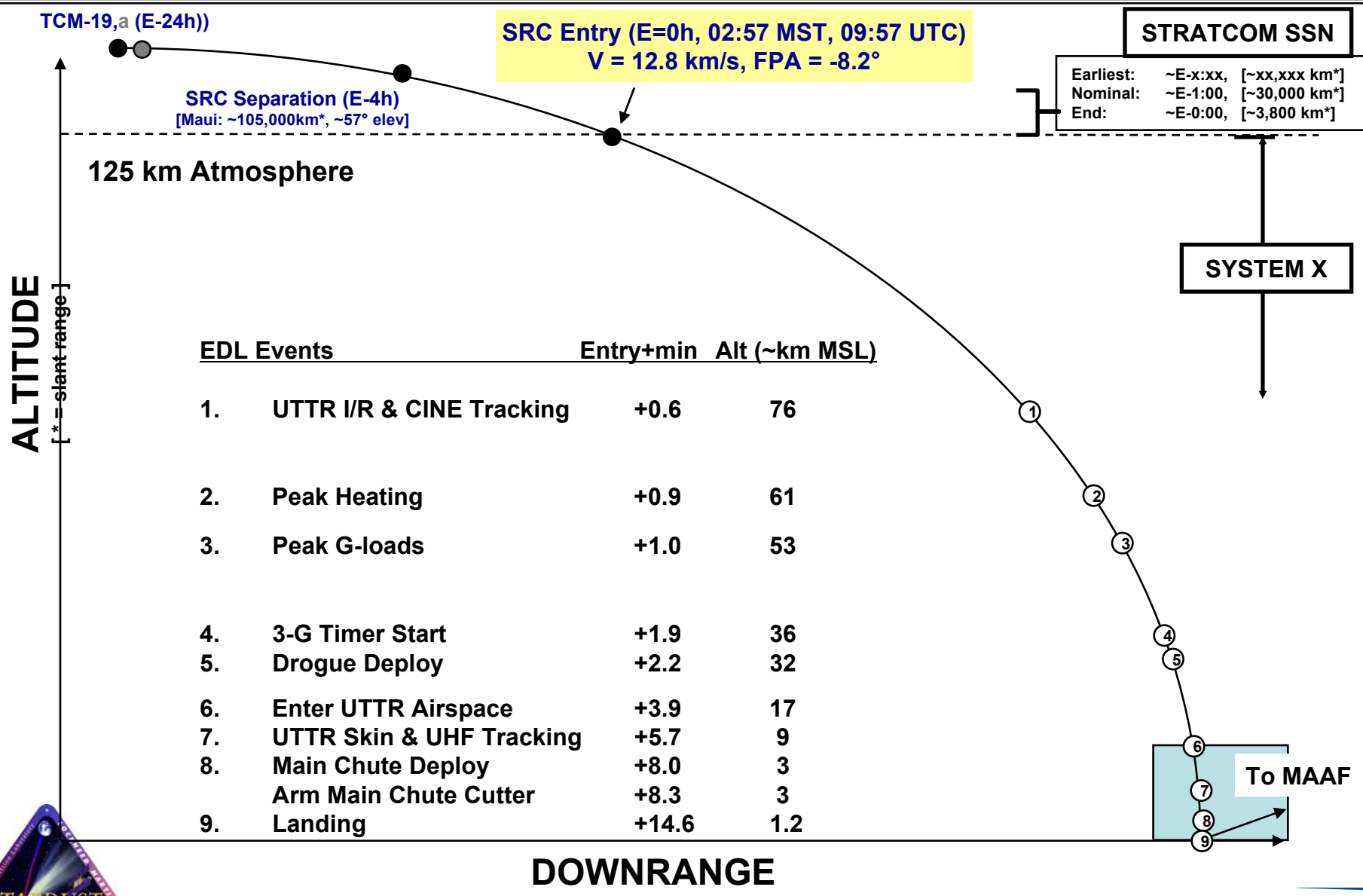
1. SRC Release Enable (ground command)
2. SRC Release Fault Protection (spacecraft flight software)
3. SRC Release Disable (ground command)
4. Divert Maneuver Disable (ground command)



* Red or dashed = contingency or single failure anomaly



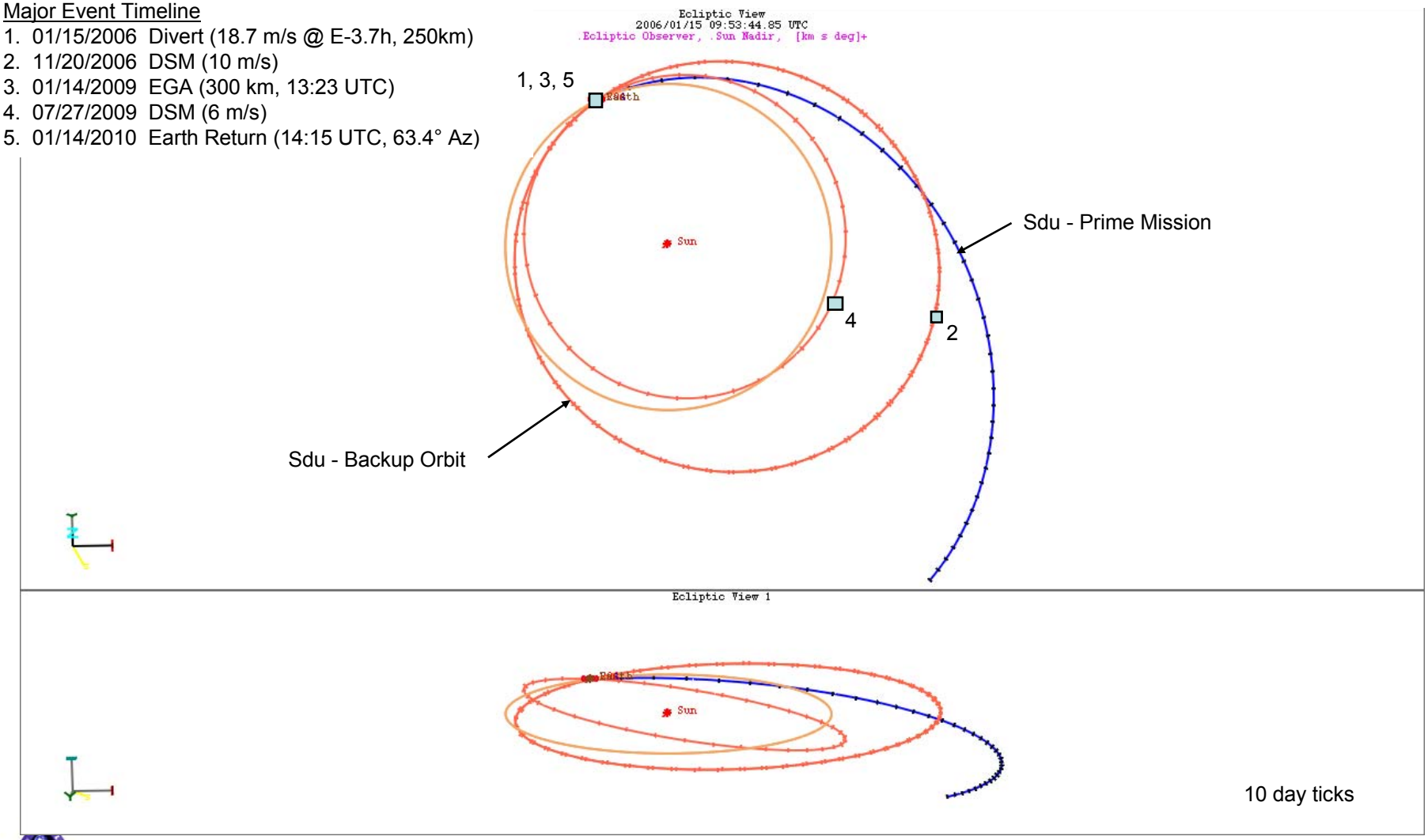
Entry, Descent and Landing



Backup Orbit Option

Major Event Timeline

1. 01/15/2006 Divert (18.7 m/s @ E-3.7h, 250km)
2. 11/20/2006 DSM (10 m/s)
3. 01/14/2009 EGA (300 km, 13:23 UTC)
4. 07/27/2009 DSM (6 m/s)
5. 01/14/2010 Earth Return (14:15 UTC, 63.4° Az)



EDL COVERAGE SUMMARY

- EDL IS A SERIES OF TRAJECTORY MANEUVERS
  STARTING IN NOVEMBER - SIX MANEUVER OPPORTINITIES
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JOINT USERS RESOURCE ALLOCATION PLANNING COMMITTEE

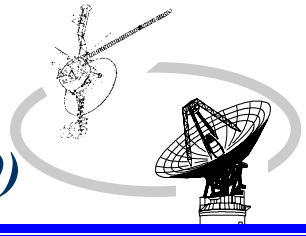
Resource Analysis Team

May 19, 2005

Joaquin Retana

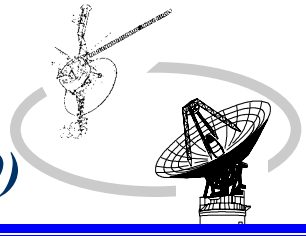
Mid-Range Scheduling Status

- **RESOURCE NEGOTIATION STATUS**
  - 2005 WEEKS 25 - 28 (THRU 07/17/2005) WERE RELEASED TO DSN SCHEDULING ON 05/04/2005.
  - 2005 WEEKS 29 - 32 (THRU 08/14/2005) ARE DUE TO BE RELEASED TO DSN SCHEDULING ON 05/27/2005.
  - 2005 WEEKS 33 - 48 (THRU 12/04/2005) ARE AWAITING CONFLICT RESOLUTION
- The Mid-range Scheduling process has negotiated schedules 27 weeks ahead of real-time. Currently, there are 8 weeks of conflict-free schedules. Conflict Resolution is required for the following twenty (20) weeks: 29 through 48.



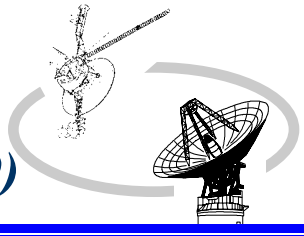
– Ongoing / Approved Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
DSN Antenna Calibration	DSN	--	--	--
DSS Maintenance	DSS	--	--	--
DSN ZDD Calibration	DSN	11/01/04	--	--
European and Global VLBI Systems	EGS	--	--	--
Ground Based Radio Astronomy	GBRA	--	--	--
Reference Frame Calibration (Cat M&E and Clock Sync)	DSN	--	--	--
Space Geodesy	SGP	--	--	--
Voyager 2	VGR2	08/20/77	10/15/89	09/30/06
Voyager 1	VGR1	09/05/77	12/31/80	09/30/06
Goldstone Solar System Radar	GSSR	04/01/85	--	--
Ulysses	ULYS	10/06/90	09/11/95	03/30/08
Geotail	GTL	07/24/92	07/24/95	09/30/06
Wind	WIND	11/01/94	11/01/97	09/30/06
SOHO	SOHO	12/02/95	05/02/98	12/31/08
Polar	POLR	02/22/96	08/23/97	09/30/06
Gravity Probe B (non Spacecraft support)	GPB	06/01/96	08/31/05	TBD
Mars Global Surveyor	MGS	11/07/96	02/01/01	11/03/08



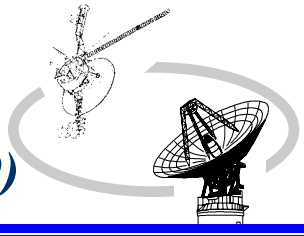
– Ongoing / Approved Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
Advance Composition Explorer	ACE	08/25/97	02/01/01	09/30/10
Cassini	CAS	10/15/97	06/30/08	06/30/10
Stardust	SDU	02/07/99	02/15/06	- - -
Chandra X-ray Observatory	CHDR	07/23/99	07/24/09	07/24/14
Imager for Magnetopause-to-Aurora Global Exploration	IMAG	03/25/00	05/30/02	09/30/10
Cluster 2 - S/C #2 (Samba)	CLU2	07/16/00	02/15/03	12/31/09
Cluster 2 - S/C #3 (Rumba)	CLU3	07/16/00	02/15/03	12/31/09
Cluster 2 - S/C #1 (Salsa)	CLU1	08/09/00	02/15/03	12/31/09
Cluster 2 - S/C #4 (Tango)	CLU4	08/09/00	02/15/03	12/31/09
Mars Odyssey 2001	M01O	04/07/01	08/24/04	11/30/08
Wilkinson Microwave Anisotropy Probe	WMAP	06/30/01	10/01/03	09/30/09
Advanced Tracking and Observational Techniques (ATOT)	ATOT	02/01/02	12/31/08	- - -
International Gamma Ray Astrophysics Lab	INTG	10/17/02	12/18/04	12/31/08
Hayabusa (MUSES - C)	MUSC	05/09/03	06/10/07	- - -
Mars Express Orbiter	MEX	06/02/03	02/11/06	12/31/08
Spirit (Mars Exploration Rover - A)	MER2	06/10/03	04/06/04	09/30/06
Opportunity (Mars Exploration Rover - B)	MER1	07/07/03	04/27/04	09/30/06



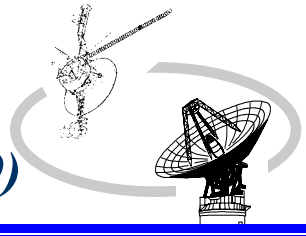
– Ongoing / Approved Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
Spitzer Space Telescope (SIRTF)	STF	08/25/03	02/25/06	10/19/08
Rosetta	ROSE	02/26/04	12/31/15	- - -
Messenger	MSGR	08/03/04	03/19/12	- - -
Deep Impact	DIF	01/12/05	08/05/05	- - -
Mars Reconnaissance Orbiter	MRO	08/10/05	12/31/10	12/31/15
Venus Express	VEX	10/26/05	04/09/06	TBD
New Horizons	NHPC	01/11/06	04/17/16	TBD
Stereo Ahead	STA	02/11/06	05/16/08	05/17/11
Stereo Behind	STB	02/11/06	05/16/08	05/17/11
Space Technology 5	ST5	02/28/06	06/11/06	TBD
Dawn	DAWN	06/17/06	01/12/16	TBD
Lunar - A	LUNA	08/01/09	02/04/10	- - -
Kepler Mission	KLM	06/01/08	06/30/12	- - -

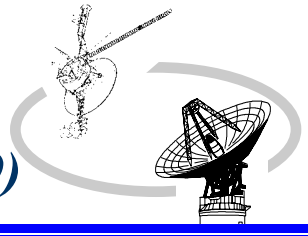


– Advanced / Planning Projects –

Project	Acronym	Launch or Start	EOPM	EOEM
SELENE	SELE	02/01/07	02/21/07	03/01/08
Phoenix	PHX	08/03/07	10/26/08	TBD
Lunar Reconnaissance Orbiter	LRO	11/15/08	TBD	TBD
Mars Telecommunications Orbiter 2009	MTO	09/22/09	08/19/20	TBD
Mars Science Laboratory 2009	MSL	10/25/09	03/04/12	TBD
Space Interferometry Mission	SIM	02/14/10	08/30/20	TBD
James Webb Space Telescope	JWST	08/01/11	07/31/16	TBD
Mars Placeholder 2011	M11L	10/30/11	09/10/14	TBD
Mars Placeholder 2013	M13O	11/28/13	08/21/16	TBD



- **ON-GOING SPECIAL STUDIES/ACTIVITIES**
  - Downtime Planning
  - MADB/TIGRAS Testing and Training
  - RARB Prep



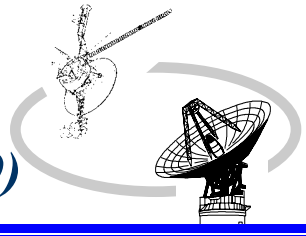
RESOURCE ALLOCATION REVIEW BOARD TIMELINE

for August 9, 2005

Review Period:

July, 2006 – December, 2008

	DATE	WORKDAYS	MILESTONES
–	05/03/05	-68 DAYS	DISTRIBUTE MISSION SET, MAJOR EVENTS AND USER LOADING PROFILES TO ALL PROJECTS/USERS FOR VERIFICATION
–	05/20/05	-55 DAYS	DEADLINE FOR PROJECTS/USERS RESPONSE TO MISSION SET, MAJOR EVENTS AND USERS LOADING PROFILES
–	05/31/05	-49 DAYS	START PRELIMINARY ANALYSES, CONTENTIONS AND RECOMMENDATIONS
–	07/14/05	-18 DAYS	NASA HEADQUARTERS SCIENCE REVIEW
–	07/15/05	-17 DAYS	PUBLISH RAPWEB PRELIMINARY EVENTS, CONTENTIONS AND RECOMMENDATIONS
–	08/01/05	-6 DAYS	COMPLETE REVIEW OF RAPWEB PUBLISHED CONTENTIONS AND RECOMMENDATIONS WITH PROJECT REPRESENTATIVES FOR ACCEPTANCE OR REJECTION
–	08/04/05	-3 DAYS	PUBLISH FINAL CONTENTIONS AND RECOMMENDATIONS ON THE RAPWEB
–	08/08/05	-1 DAY	DISTRIBUTE REVIEW BOARD MATERIAL TO RARB BOARD MEMBERS
–	08/09/05	XXXXX	RESOURCE ALLOCATION REVIEW



◆ SPECIAL STUDY SUMMARY

STEREO Ahead & Behind Study of Increased Support Feb 2006 - May 2006

Completed: April 26, 2005

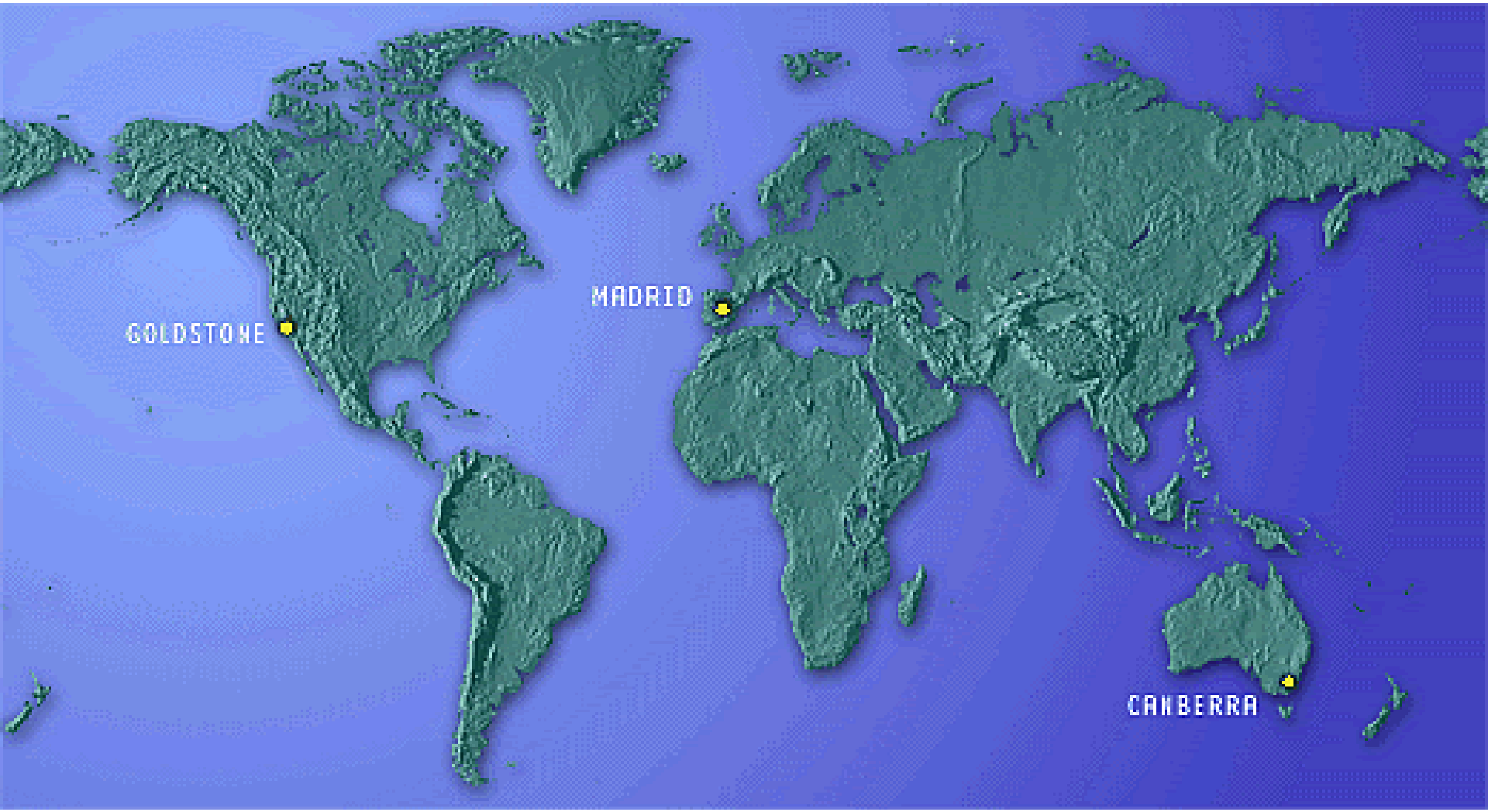
Purpose

The purpose of this study was to evaluate STA's and STB's additional attenuator, maneuver, maneuver backup support and phasing requirements based on the updated requirements received from the STEREO Project on January 21, 2005

Conclusion

Based on the current launch and early operations priorities STA and STB are forecast to receive greater than 90 percent supportability. While RAPSO recommends that maneuver backup support be deleted, STA and STB could use two downlink channels as a backup for the maneuvers at CDSCC, MDSCC and at GDSCC if additional reliability is sought.

DSN Antenna Downtime Status and Forecast



http://rapweb.jpl.nasa.gov/planning

Antenna Downtime Status And Forecast Schedule

Major DSN Downtimes by Date

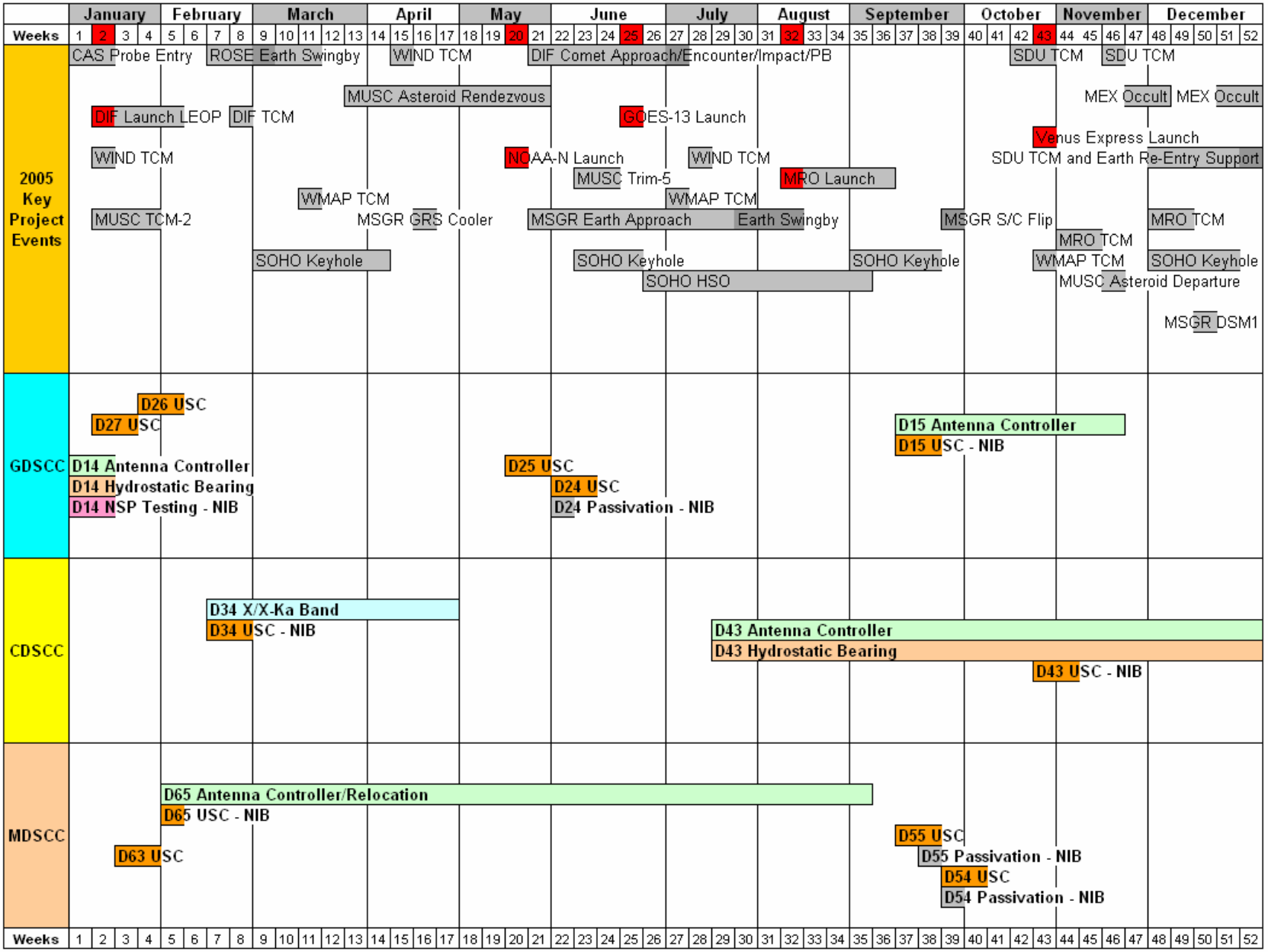
05/17/2005 21:27 UTC Time
Tuesday, May 17, 2005 2:26:08 PM Your Local Time

2005							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 65	Antenna Controller Replacement	01/31/2005 00:00	08/31/2005 23:59	213	05 - 35	031	243
DSS 65	Relocation	01/31/2005 00:00	08/31/2005 23:59	213	05 - 35	031	243
DSS 25	USC Installation	05/16/2005 00:00	05/25/2005 23:59	10	20 - 21	136	145
DSS 24	USC Installation	05/30/2005 00:00	06/08/2005 23:59	10	22 - 23	150	159
DSS 24	NIB - Transmitter Heat Exchanger & Passivation	06/01/2005 00:00	06/03/2005 23:59	3	22 - 22	152	154
DSS 43	Antenna Controller Replacement	07/18/2005 00:00	01/01/2006 23:59	168	29 - 52	199	001
DSS 43	NIB - USC Installation	07/18/2005 00:00	07/31/2005 23:59	14	29 - 30	199	212
DSS 43	Hydrostatic Bearing	07/18/2005 00:00	01/01/2006 23:59	168	29 - 52	199	001
DSS 15	USC Installation - NIB	09/12/2005 00:00	09/21/2005 23:59	10	37 - 38	255	264
DSS 15	Antenna Controller Replacement	09/12/2005 00:00	11/20/2005 23:59	69	37 - 46	255	323
DSS 55	USC Installation	09/12/2005 00:00	09/21/2005 23:59	10	37 - 38	255	264
DSS 55	NIB - Transmitter Heat Exchanger & Passivation	09/19/2005 00:00	09/21/2005 23:59	3	38 - 38	262	264
DSS 54	USC Installation	09/26/2005 00:00	10/05/2005 23:59	10	39 - 40	269	278
DSS 54	NIB - Transmitter Heat Exchanger & Passivation	09/26/2005 00:00	09/28/2005 23:59	3	39 - 39	269	271

2006							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 63	Antenna Controller Replacement	05/22/2006 00:00	09/03/2006 23:59	105	21 - 35	142	246
DSS 24	X/X-Ka Band	09/04/2006 00:00	10/22/2006 23:59	49	36 - 42	247	295
DSS 45	Antenna Controller Replacement	10/09/2006 00:00	12/10/2006 23:59	63	41 - 49	282	344

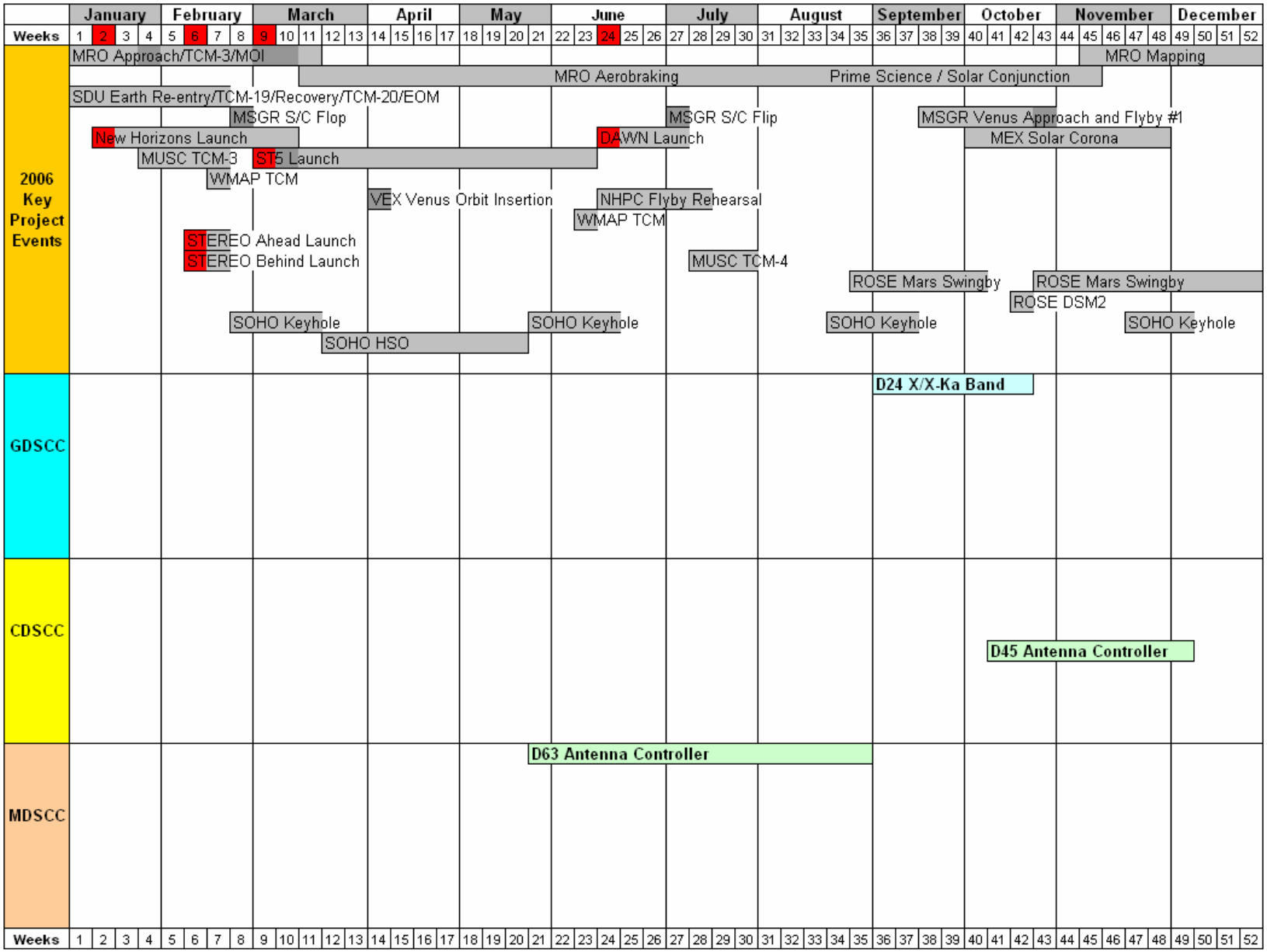
2007							
Site	Description	Start	End	Duration (Days)	Weeks	Start DOY	End DOY
DSS 54	X/X-Ka Band	06/04/2007 00:00	07/29/2007 23:59	56	23 - 30	155	210

Antenna Downtime Status And Forecast 2005



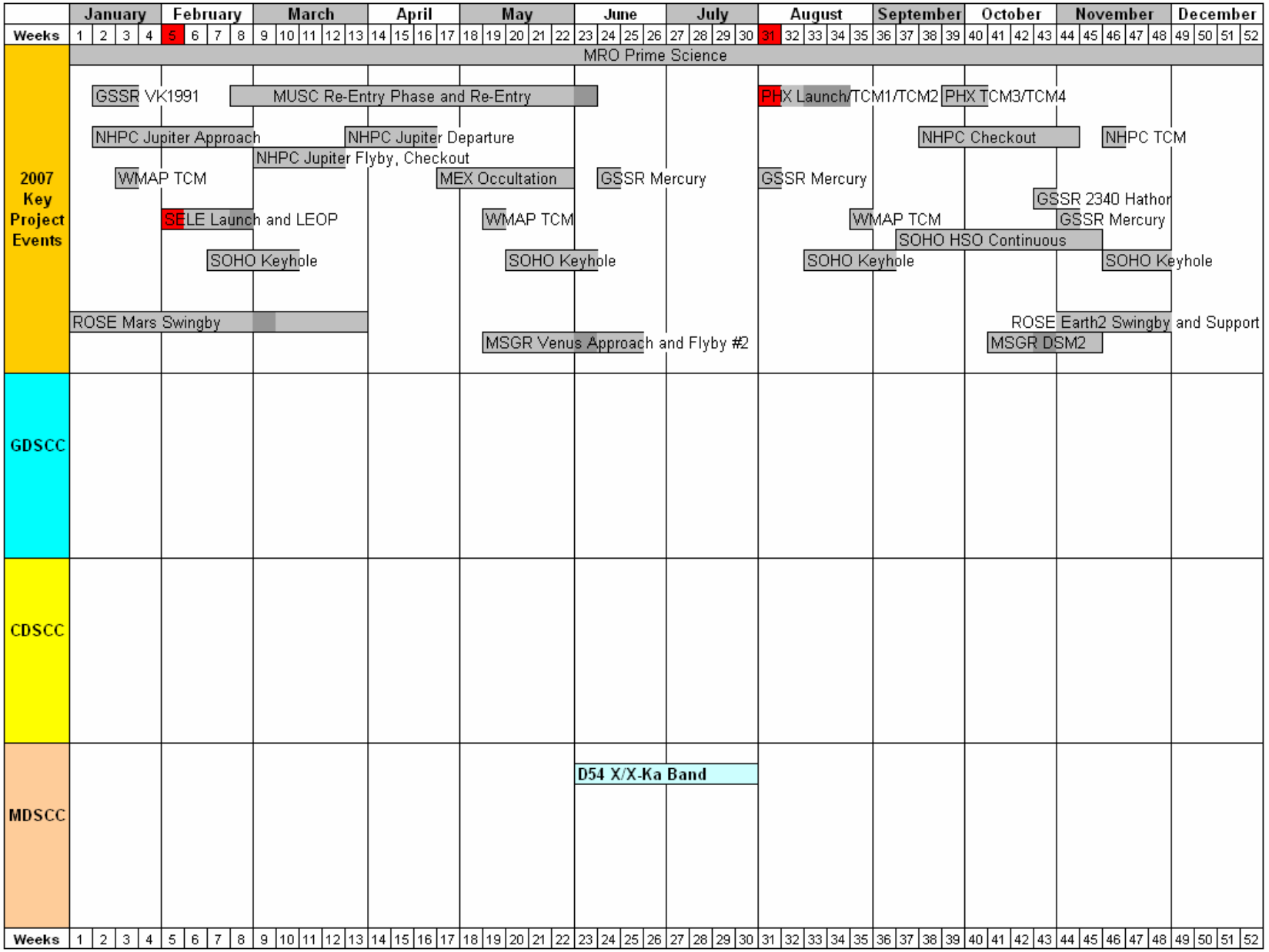
Revised: May 17, 2005

Antenna Downtime Status And Forecast 2006



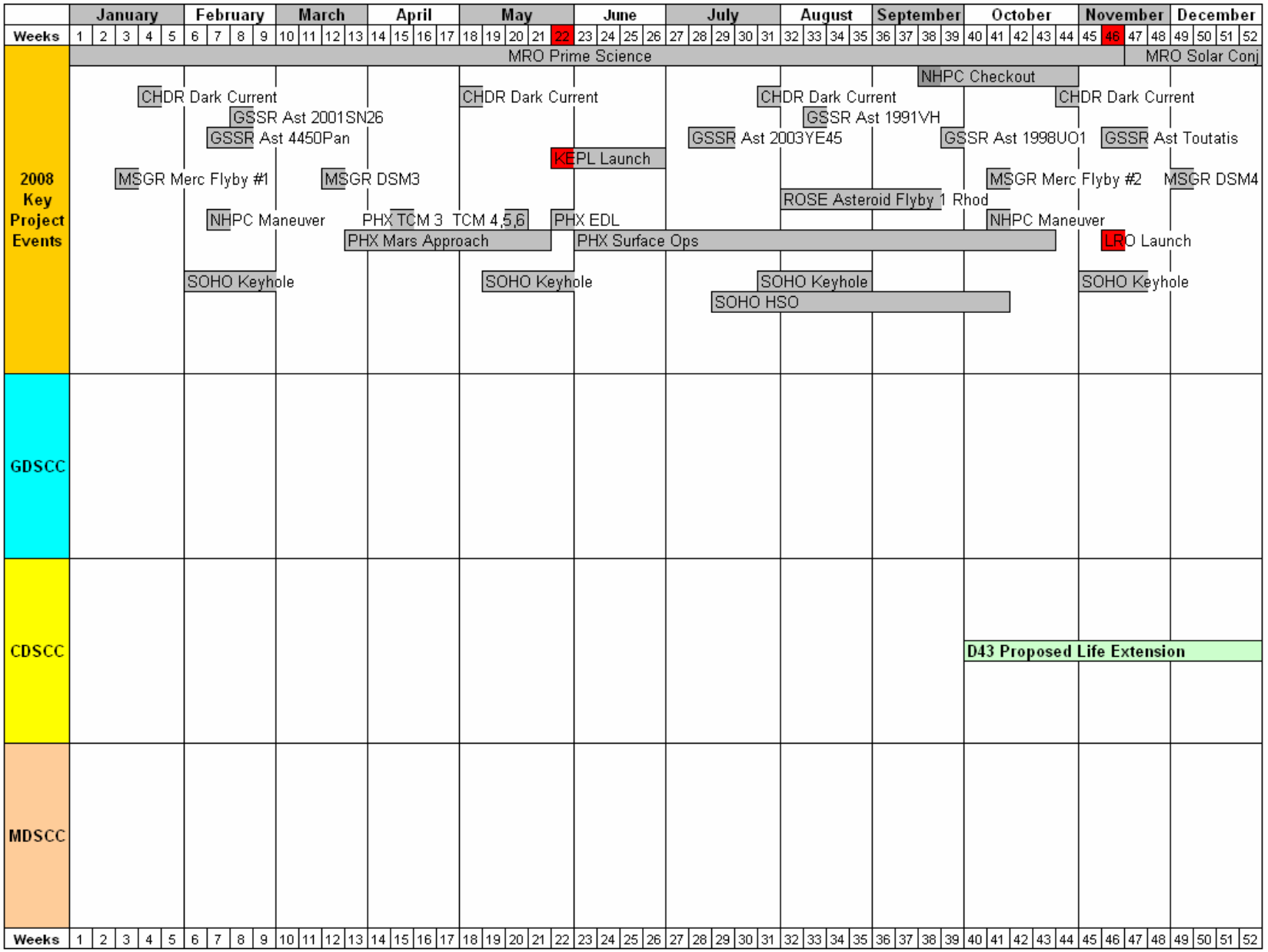
Revised: May 17, 2005

Antenna Downtime Status And Forecast 2007



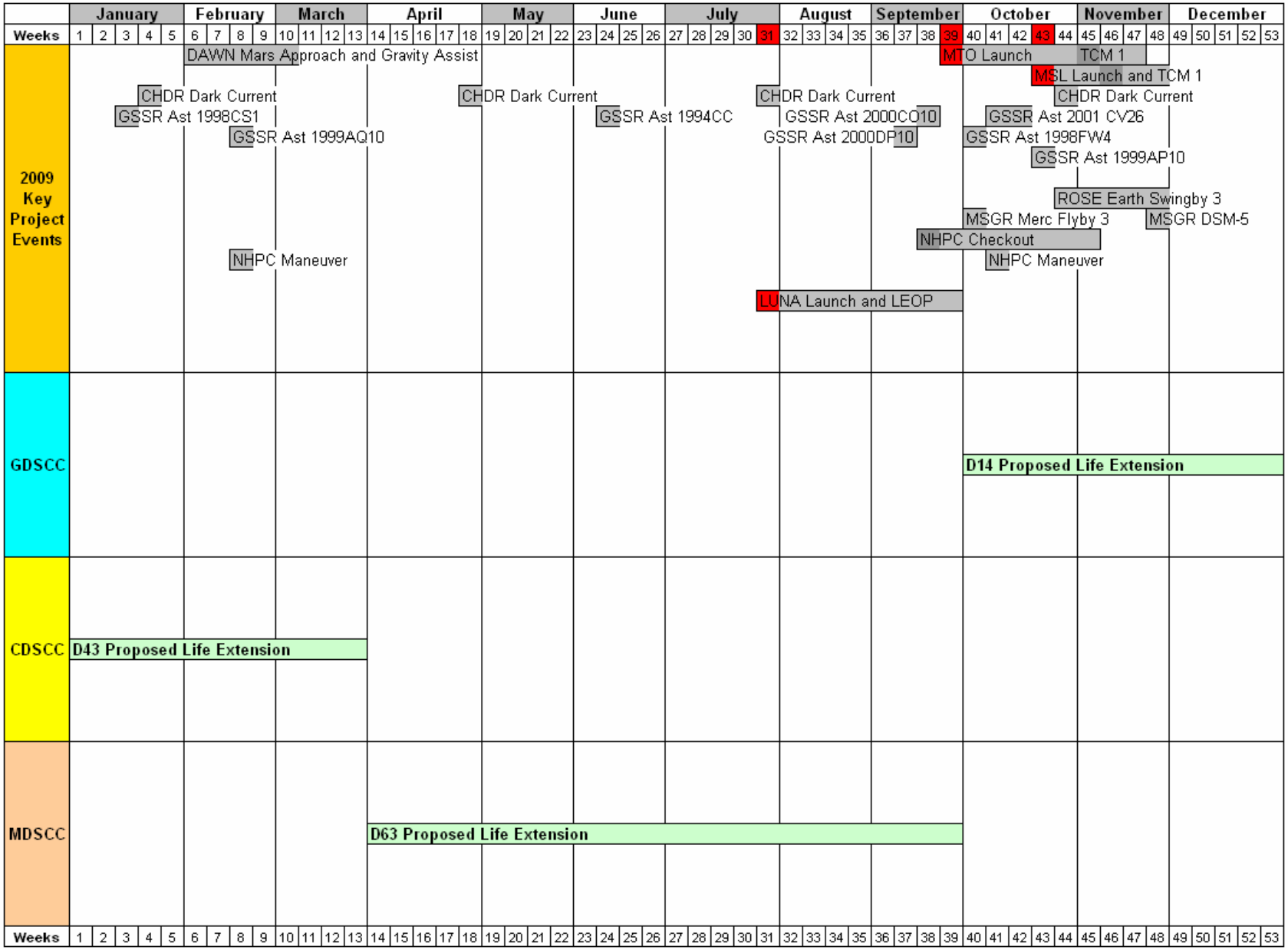
Revised: May 18, 2005

Antenna Downtime Status And Forecast 2008



Revised: May 17, 2005

Antenna Downtime Status And Forecast 2009



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DSN Resource Implementation Planning Matrix by Complex

Complex	Station	Subnet	S-Band		X-Band		Ka-Band		NSP
			Down	Up	Down	Up	Down	Up	
10	DSS-14	70M	✔	✔	✔	✔	N/A	N/A	✔
10	DSS-15	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
10	DSS-16	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
10	DSS-24	34B1	✔	✔	✔	✔	10/23/06	N/A	✔
10	DSS-25	34B2	N/A	N/A	✔	✔	✔	✔	✔
10	DSS-26	34B2	N/A	N/A	✔	✔	✔	N/A	✔
10	DSS-27	34HSB	✔	✔	N/A	N/A	N/A	N/A	N/A
40	DSS-34	34B1	✔	✔	✔	✔	TBD	N/A	✔
40	DSS-43	70M	✔	✔	✔	✔	N/A	N/A	✔
40	DSS-45	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
40	DSS-46	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
60	DSS-54	34B1	✔	✔	✔	✔	08/01/07	N/A	✔
60	DSS-55	34B2	N/A	N/A	✔	✔	✔	N/A	✔
60	DSS-63	70M	✔	✔	✔	✔	N/A	N/A	✔
60	DSS-65	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
60	DSS-66	26M	✔	✔	N/A	N/A	N/A	N/A	N/A

N/A = Capability Not Planned

xx/xx/xx = Capability Date Recently Change

As of: 05/18/05

✔ ✔ ✔ = Capability Recently Exists

✔ = Capability Exists

DSN Resource Implementation Planning Matrix by Subnet

Complex	Station	Subnet	S-Band		X-Band		Ka-Band		NSP
			Down	Up	Down	Up	Down	Up	
10	DSS-16	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
40	DSS-46	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
60	DSS-66	26M	✔	✔	N/A	N/A	N/A	N/A	N/A
10	DSS-27	34HSB	✔	✔	N/A	N/A	N/A	N/A	N/A
10	DSS-24	34B1	✔	✔	✔	✔	10/23/06	N/A	✔
40	DSS-34	34B1	✔	✔	✔	✔	TBD	N/A	✔
60	DSS-54	34B1	✔	✔	✔	✔	08/01/07	N/A	✔
10	DSS-25	34B2	N/A	N/A	✔	✔	✔	✔	✔
10	DSS-26	34B2	N/A	N/A	✔	✔	✔	N/A	✔
60	DSS-55	34B2	N/A	N/A	✔	✔	✔	N/A	✔
10	DSS-15	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
40	DSS-45	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
60	DSS-65	34HEF	✔	N/A	✔	✔	TBD	N/A	✔
10	DSS-14	70M	✔	✔	✔	✔	N/A	N/A	✔
40	DSS-43	70M	✔	✔	✔	✔	N/A	N/A	✔
60	DSS-63	70M	✔	✔	✔	✔	N/A	N/A	✔

N/A = Capability Not Planned

xx/xx/xx = Capability Date Recently Change

As of: 05/18/05

✔ ✔ ✔ = Capability Recently Exists

✔ = Capability Exists